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AUTHOR	French, John W.
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ABSTRACT

An earlier report presented the results of an inverse factor study of interrelationships among students over a variety of measures associated with motivation to study in college. Seven of the 10 motivational factors revealed in that study were related to academic criteria that are considered to be of practical importance in the admissions process. In this study, cross-validation of students from a new class comprising 82 men and 56 women revealed that items loading each of the seven factors continued to correlate and to predict four academic criteria: team work, standing (academic), independent study, and faculty ratings (of participating students). Multiple regression showed that three of the seven factors were useful predictors when they were used with SAT scores and high school ranks. The three factors are emotional stability, concerned responsibility toward society, and conscientiousness in studying. The recommendations present a list of these three factors, loaded with their corresponding items, to be used either for obtaining factor scores or as part of a battery of individual predictors. It is felt that the factors can be of definite usefulness in the admissions process at New College. (WM)

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VALIDATION OF MOTIVATIONAL TYPES

John W. French

September 1969

Second of two reports under project entitled: Theory and Measurement of Motivational Factors in High-Level Training. Office of Naval Research, Contract N00014-68-C-0116, John W. French, Principal Investigator.

New College, Sarasota, Florida 33578

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ABSTRACT

An earlier report described an inverse factor study which analyzed the intercorrelations among students over a series of items concerned with motivation to work in college. Ten motivational types were separated. Seven of these types were found in that study to have some reasonable amount of validity for the college criteria. This report describes the cross-validation of items and scales of items that were assembled to measure these seven types. Considering the chance fluctuations that are bound to occur with data based on mere items and on groups of students numbering well under 100, the cross-validation was successful. Multiple regression showed three of the seven factors to be useful predictors when used in addition to SAT and high-school rank. Items useful for measuring these three factors were selected on the basis of the earlier study, on the basis of their allegiance to one of the factors, and on the basis of their direct validity for the college criteria. The three factors are: Emotional Stability, Concerned Responsibility toward Society, and Conscientiousness in Studying.

NOTE: The data described here give clear evidence that the recommendations made in this report can be of definite usefulness in the admissions process at New College.

VALIDATION OF MOTIVATIONAL TYPES

In a phase of this study reported earlier,[1] college students were related to one another over a variety of measures associated with motivation to study in college. The inverse factor analysis of these relationships revealed ten motivational types. Data for 12 hypothetical students, entering the analysis as an extension matrix, helped to interpret the types found among the real students. In a table of results, the average value on each measure for students of each type is compared with the average value for students who were found to be the opposites of each type. Consistencies among the measures of each type make good psychological sense. In addition, the actual students, all known personally to the author, seemed adequately to belong to the types into which the analysis placed them.

Of the ten factors found in that study, seven appeared to have a useful amount of relationship to the academic criteria that were of practical importance in the admissions process of the college. The present study is a cross-validation with students from a new class to find out whether the items loading each of the seven factors continue to be related with one another and continue to be useful predictors of academic criteria.

The following four academic criteria were used:

Team Work (T). Since students were required to take only a very few courses for graduation, and since no grades are given, the number of courses completed satisfactorily during the first year is a very telling criterion of voluntary academic participation.

Standing (S). Students were required to pass a comprehensive examination

[1]French, J. W. Motivational Types Among College Students. ONR report, April 1969 and Multivariate Behavioral Research, in press.

in the humanities covering certain course work and to pass two courses in social sciences and two in natural sciences. The score used here is an inverse of the number of deficiencies remaining at the end of the year.

Independent Study (I). This is a rating based on these rather full comments in the record that are made of the student's required independent study project.

Faculty Ratings (F). Faculty members received a list of students in the class with instructions to mark with a plus those whom they were glad had been admitted and with a minus those whom they were sorry had been admitted. Sixty percent of the 40 faculty members responded. This score was the number of pluses less the number of minuses received by the student.

Below is a list of all ten of the motivational factors found in the earlier study. Notations to the right of the list indicate the validities found in that study, using three of the four criteria. The figures represent differences in average scores made by subjects with high and with low loadings on each factor. Units are quarters of a standard deviation. The seven factors to be cross-validated in this study are numbers 3, 4, 5, 7, 8, 9 and 10.

		T	I	F
1.	Moral intellectual vs. practical	-1	-1	0
2.	Negative vs. eager or appreciative	1	-2	2
3.	Emotionally disturbed vs. stable and well liked	-2	1	-6
4.	Irresponsible vs. concerned about self and others	-2	3	1
5.	Hippie vs. conventional, cooperative, and stable	0	2	-3
6.	Business-like vs. humanistic and theoretical	1	0	0
7.	Literary vs. lacking an intellectual goal	2	1	2
8.	Conscientious studier vs. broad interests	5	1	2
9.	Participates in extracurriculars vs. seeks degree	-4	-4	-1
10.	Academically challenged vs. alienated	6	4	6

DATA AND SUBJECTS

Since the factor analysis had not been completed when the subjects for this

study arrived at college in September 1968, all questionnaire materials involved in the factor analysis were administered to the new subjects. Later in the year, the students' responses to the salient items for the seven important factors were gleaned from the answer sheets of these questionnaires, from high-school reports, and from the students' applications for admission to college. The academic criteria for these students became available in June 1969.

The questionnaire and application-blank items varied from dichotomies to nine-point scales, and some required open-end responses. For the purposes of this study all of the items were dichotomized at whatever point was indicated by the earlier data to produce the most even split. Dichotomization was carried out, because it made the correlations of all of the items more comparable and it gave all items nearly equal weights when the factor scales were scored by simply counting the number of items responded to in particular directions.

Eight high-school ratings, which contained much redundance, were used in constructing the factor scales. They were combined into one variable for purposes of correlation, but were given reasonable weight in computing scale scores by allowing the combined rating to take scores from zero to three.

There were 174 students in the class. Data were complete for 82 men and 56 women. The students at this college are attracted because of certain educational innovations including lack of grades, much independent study, and a relatively favorable student-faculty ratio. They are highly selected by the college, the great majority coming from the upper quarter of their secondary school classes. The average College Board Scholastic Aptitude Test (SAT) score for these subjects, averaging the verbal and mathematical sections, was 687 for men and 671 for women.

ANALYSIS

A convenient way to study the internal consistency of items in the factor scales as well as to find the validities of both items and scales for the four criteria was to compute, separately for males and females, matrices of product-moment intercorrelations for all of the separate items, the seven scales and the four criteria. The SAT and a variable derived from the secondary school rank in class were added to the analysis, since these constitute conventional predictors that were already being used.

Product-moment correlations for the items are spuriously small, because the items are dichotomous. However, this is no disadvantage, because item correlations will only be compared with one another and total scale validities will only be compared with one another. The correlations between items and scales are the indicators of item internal consistency. The intercorrelations among items were merely inspected to check on obvious groupings not in allignment with the previously observed factors.

Key punching and computation were carried out by Herbert W. Eber, Psychological Consultant, Atlanta, Georgia.

Analysis was completed by the hand computation of beta-weights for predicting an overall or average criterion defined as one having the average of the validities observed for the four separate criteria.

RESULTS

Table 1 lists the items that are analyzed. The variables in the inter-correlation matrices, one for males and one for females, may be summarized as follows:

25 dichotomous items from specially made questionnaires

45 dichotomous items from Educational Testing Service's College Student Questionnaire (CSQ), including 3 scale scores

3 dichotomous items from the college application blank

1 4-point item representing secondary-school ratings

7 factor scales derived from the above items.

2 conventional predictors: SAT and high-shcool rank-in-class

4 college criteria described earlier

The two matrices each with 87 variables are too large to present with this report. Portions of them thought to be of interest to the reader are reported in the tables discussed below.

Table 1 illustrates the amount of internal consistency in the factor scales by giving the correlations between the items and the scale scores. In this table a plus or minus is placed to the right of a correlation to indicate how a particular item was used in computing a particular scale score. Since there was an average of only 17 items in each scale, the very presence of the item in the scale produces an appreciable spurious correlation between the item and the scale. While the effect of this depends on the level of correlation and on the ratio of variances between the item and the scale, it will be satisfactory to reduce by about .24 the correlation shown in Table 1, if the item was used in constructing the scale. After this adjustment is made, a remaining correlation in the weighted direction would indicate consistency for that item. Adjusted correlations in the wrong direction reveal items shown by these data to be inappropriately used as part of the scale. In addition, some items that are very suitable for a scale were, nevertheless, not used for that scale because of redundancy. For example, the Factor 8 scale is supposed to represent conscientious studying. The table shows that Item 151 (claims academic superiority) should <u>not</u> have been included. Item 93 (tried for honor roll

in high school) was avoided as it was too much like others on that scale, and Item 26 (studies for tests) should have been included on the basis of consistency, but it was found to be invalid for any New College criteria. As another example, the Factor 4 scale is supposed to represent concerned responsibility. The table shows that Item 119 (dependent on parents) should not have been included, while Item 97 (worked on assignments in high-school) was avoided because of redundancy, and Item 156 (referred to the divinity in his "philosophy of life") should have been included.

A final section of this report will use the results of both this and the earlier study to make specific recommendations that could benefit the admissions process. Further information on specific items is contained in Table 5 discussed below.

Tables 2, 3, and 4 give the validities of the SAT, High-school rank, and the seven factors for the four college criteria. Table 2 is for males; Table 3 is for females. Table 4 gives the averages of the figures in Table 2 and 3 and also gives a simple average of validities over the four criteria. These final average validities may be considered to be the validities for some sort of overall college criterion. They are the ones that are used below in computing suitable weights for the predictors.

The correlations for males and for females are reasonably similar. The sizes of the differences between them are nothing more than can be expected when the number of subjects in each one is well under 100. For this reason it seemed appropriate to average the figures in these tables to produce Table 4.

The intercorrelations of predictors given in Table 4 are reasonably consistent with validities found in the earlier study and reported in the first section of this report. In general, it can be said that SAT, H.S. rank, and Factors 7, 8 and 10 are positive predictors and that Factors 3, 4, 5, and 9 are negative. There should be

and there is a tendency for the positive predictors to intercorrelate positively with one another and for the negative predictors to do likewise. An exception to this seems to be that Factor 7, which was weakly positive in the earlier study, is measuring more negative characteristics than was expected. Other than this, there is little in the intercorrelations requiring mention except that the very high correlation between Factor 3 (emotionally disturbed) and Factor 5 (hippie) suggests that it will not be useful to measure these two factors separately.

Since the validities given at the right and at the bottom of Table 4 are reasonably similar to those in the earlier study, the cross-validation can be said to be highly satisfactory, considering the shortness of the scales and the small numbers of students. It was expected, of course, that the positive predictors would have positive validities and that the negative predictors would have negative ones. This expectation is born out very well, except that here again the results for Factor 7 constitute a surprise; the validities are negative when they were expected to be positive. It is also worth comment that Factor 9 is not as strongly negative and Factor 10 is not as strongly positive as in the earlier study.

The four criteria are very much like one another with respect to their correlations with the predictors. A rather minor exception to this is the somewhat lower validities for independent study, probably caused by the relatively poor reliability of this criterion. Because of the consistent behavior of the four criteria, their validities were averaged, and the averages will be used in the computation of multiple regression weights.

First, a multiple-regression equation was developed for predicting the average criterion (C) with SAT (S), high-school rank (R), and all seven factor scales (F_3, F_4, etc.) The equation is as follows:

$$C=.06S+.17R-.05F_3 - .14F_4 - .05F_5 + .00F_7 + .19F_8 + .10F_9 - .06F_{10}$$

This equation, of course, both considers the redundance caused by overlapping

(correlation) among the predictors and also considers the average validities given in Table 4. In particular, it is not surprising to find that high-school rank should be weighted about three times as heavily as SAT (.17 to .06), that Factor 4 is good in a negative direction and Factor 8 is good in a positive direction. While the other factors have lower validities than these, it is surprising to find that they contribute so little that is not already covered by some of the better predictors. It is also interesting to observe the switch in signs between the validities and the weights for Factor 9 and 10. This circumstance further encourages a decision to ignore these two factors. On the other hand, the high correlation between factors 3 and 5 suggests that these two factors are sharing the same usefulness, and so one of them alone might carry enough weight to make its measurement worthwhile.

A second regression equation was computed for the two conventional criteria and Factors 3, 4 and 8. SAT is retained in the equation despite its low validity and weight, because it is available and used anyway and because it has been found to be highly predictive for other colleges. Factor 3 is included despite its low weight, because it seemed likely that it would justify more weight, if it did not have to compete with Factor 5. The smaller equation is as follows:

$$C = .05\ S + .18\ R - .08F_3 - .12F_4 + .14\ F_8$$

Factors 3, 4, and 8 are all judged to have enough weight to be useful in prediction. These results, as well as the validities of individual items, are used in a later section of this report to make specific recommendations.

Table 5 gives the validities, separately for males and females, for all of the items with all four criteria. This information constitutes the ultimate test of an item, but is, of course, subject to chance fluctuations particularly because the number of cases is not large. For this reason the recommendations made below are based not only on this table, but also on the results of the earlier study and on the allegiance of the items to the factor (Table 1). The regression weights of the

factors are also critical in the selection of items, since it was they that have limited all selections to the items measuring factors 3, 4, and 8.

In Table 5 it is, of course, generally true that the items which stand high and positive on a factor (according to Table 1) tend also to have validities in the same direction as the validities of the factor (as noted in Table 4). The reverse of this is true for items that are negative on a factor.

Because of similarities between the results for the two sexes and because of similarities among the validities for the four criteria, the procedure leading up to the recommendations made by this paper has included averaging the sexes and averaging the validities for the four criteria. Nevertheless, it is interesting to study some of the sex differences and criterion differences displayed in Table 5. A few examples appear below.

The two sexes almost always react alike in direction. That is, if a positive response to an item predicts a high criterion for one sex, it usually does for the other, although differences in the strength of the relationship are common. A few gross differences in direction will be mentioned.

Item 27 asks about the importance of working to avoid failure. Emotional stability (negative of Factor 3) is indicated by the assertion that it is not important to work for this reason. In this particular sense, girls are better off not worrying about failure, while boys evidently need some of the motivation that this particular threat provides.

Item 51 asks whether independent study is enjoyed. A positive response is related to other items indicating emotional stability. For boys, the enjoyment of independent study is desirable. For girls, the enjoyment of independent study is associated in these data with a high number of deficiencies. Perhaps the enjoyment of independent study reacts with girls as a distraction from their term work.

However, since this explanation does not seem very convincing, it is reasonable to suspect that this finding is more likely than otherwise to reverse itself for another group of students.

Item 122 asks the student if he likes to do things in his own way. A positive answer indicates stability. For boys this is related to good academic work; for girls it is related to poor work, especially independent study. This seems to fit some of our traditional ideas about the sexes. A boy is considered to lack manliness, if he does not act independently; a girl is suspect if she does. Perhaps the girls who assert independence do it for reasons that are not compatible with independent study.

If wide differences among the criteria could be found, it would show that we can detect a variety of aspects of a student's behavior. Unfortunately, however, these data agree with several earlier studies at this college which show that the criteria are little more than different measures of the same thing. A host of meaningful differences in item validities for the criteria would be interesting, but little more than seemingly random fluctuations can be found. One of very few meaningful differences observable in Table 5 has to do with independent study. Notice that the independent study criterion, which affords relatively few high validities, does have exceptionally high ones for the very two items that include the word "independent": Item 51 on the enjoyment of independent study and Item 119 on independence from parents. Also, there are noticeably good validities with independent study for items having to do with writing: Item 81 on journalism (low positive validities for independent study compared to negative ones for the other criteria) and Item 92 on the student's perceived ease in writing.

RECOMMENDATIONS

The item validities in Table 5 and the associations of the items with the factors in Table 1 constitute the principal information used in selecting recommendations. Because of the validities of the factors in Table 4 and the resulting factor weights, measurement is recommended only for Factors 3, 4, and 8.

Fortunately, the technical process for selecting items only vary rarely pointed favorably to items that seemed psychologically to be inappropriate. In particular, it seemed desirable not to score negatively a positive response to seemingly "good" items. For example, the figures suggest a negative score for Item 59, creates Art; for Item 81, high-school journalism; and for Item 107, having a well-educated mother. These three items are omitted and this kind of reasoning was also used to eliminate just a very few other inappropriate technical selections.

The recommendations are listed below by factor: 10 items for Factor 3, 10 items for Factor 4, and 7 items for Factor 8. The items listed are identical to or close paraphrasings of the original items, except that the answer options are not included. Note that a sex differential is recommended for five items in the Factor 3 list, one in the Factor 4 list, and one in the Factor 8 list. In all cases, an answer of "yes" or "much" would be given a positive point toward a score for the factor named at the head of the list.

While recognizing that one item is unreliable by itself, it is reasonable to use these listed items <u>either</u> to obtain factor scores or simply as part of a battery of individual predictors.

<u>Emotional Stability</u> (The negative of Factor 3)

27. Is it <u>unimportant</u> to work hard at college to avoid failure? (Males: no; females: yes)

51. Do you enjoy independent study and research rather than regular assignments? (Males: yes; females: no)

79. Did you ever hold important offices in your high school student government? (Males: no; females: yes)

80. Did you participate at any time during high school in science activities?

84. Did you participate at any time during high school as a performer in music activities?

119. How independent of your parents do you consider yourself to be at the present time? (Males only)

122. Do you generally like to do things in your own way and without regard for what other students around you may think? (Males: yes; females: no)

139. How many times during the past year or so have you gone to an evening lecture on some serious topic (other than required lectures)?

142. (Average of high-school character ratings.)

151. Academically, are you superior, above average, average, or below average?

Concerned Responsibility Toward Society (The Negative of Factor 4)

9. Compared to others, do you usually study hard during the term?

75. Were you personally friendly with any of your high school teachers, that is, well enough acquainted to talk about matters not necessarily related to school or course work?

86. Did most of your high-school teachers probably think of you as one of their hardest workers even though not necessarily one of the brightest?

98. How well do you feel you learned how to study in high school?

125. How informed do you presently consider yourself in regard to national and international political affairs?

131. Are you concerned that persons who are not white-Anglo-Saxon-Protestant seem to have somewhat less opportunity in America?

133. Are you concerned about the many elderly people in the U. S. who are left alone to live "on crumbs of welfare measures"?

135. Would you be upset at the sight of children looking at obscene printed material at magazine stands(or elsewhere)? (Females only)

156. (In "Philosophy of Life" essay submitted with the college application, an indication of belief in the divinity.)

171. (High score on Social Conscience scale of the CSQ.)

Conscientiousness in Studying (Positive on Factor 8)

11. Compared to others, do you tend while studying to emphasize memorizing rather than reading. (Females only)

88. Compared with most of your classmates, how much would you say you studied during your senior year in high school?

89. How much time, on the average, did you spend doing homework outside class during your senior year in high school?

91. Do you think your fellow students in high school thought of you as a hard worker?

93. Did you try harder to get on (and stay on) the honor roll or merit list than the average student in your high school class?

96. Would you say that your senior year grades over-represented your ability?

97. Did you regard yourself as a more consistent and harder worker in your classroom assignments than the typical student in your high school classes?

TABLE 1

Correlation of Items With Total Scores For Factors

(Average of correlations for males and females; decimal points omitted.)

(Sign to right of figure indicates use of item in factor scales.)

No.*	Stem	Factors 3	4	5	7	8	9	10
	Special Questionnaire							
3.	Best work in least favorite area	10	00	-08-	18+	-09	06	13+
4.	Worst work in favorite area	-13	07	-11	-22-	07	04	09
5.	Most work in least favorite area	03	06	-12	17+	09	-09	06
9.	Studies hard during term	-18	-47-	-16	-11	18	01	29
10.	Studies hard before tests	21	-17	12	-03	26+	-06	11
11.	Studies by memorizing	01	-18	05	04	36+	-05	18
13.	Enjoys reading jokes	06	-15	-08	00	09	-06	24+
16.	Enjoys mathematical puzzles	-25-	06	-34-	-07	01	-07	18+
19.	Anxious before a test	43+	-17	37+	09	23	-06	10
20.	Anxious during a test	37+	-09	37+	-08	31+	-21	-03
26.	Studies for tests	06	-21-	02	00	27	-15	17
27.	Studies to avoid failure	13+	-02	19+	09	29+	-28-	-04
30.	Studies because he likes studying	-11	-15	04	13+	08	-02	-06
33.	Studies because of teachers	-05	-01	-18	-23-	16	-23	-05
34.	Studies because of family	18+	-09	01	-18	20	-22	04
38.	Not bad to study for grades	08	-13	-07	08	11	-05	35+
42.	Not bad to study to learn	01	-11	-03-	-02	07	-08	01
43.	Not bad to study for itself	-07	-20	-14	-03	-03-	-02	-01-
45.	Not bad to help world	10+	01	02	-05	02	-09	-06
46.	Not bad to study for teachers	-10	-15	-05	-07	12	-37-	03
48.	Not bad to study for students	-02	-05	09	-09	11	-38-	-10
49.	Not bad to study for yourself	01	-02	12	-04	00	04+	-02
51.	Does well at independent study	-11	-07	-26-	25+	-13	06	07
52.	Discussion is good	14+	-09	01	00	-09	32	17
59.	Creates art products	29+	-05	06	17+	05	-10	08
	College Student Questionnaire							
62.	Family influenced field	36+	-01	12	10+	-02	-08	09
63.	School influenced field	-32-	-31-	-00	-14-	06	00	04
64.	Friends influenced field	02	18+	03	13	05	13	-04
68.	Decided on an occupation	12	00	03	32+	-07	01	04
73.	Extracurriculars	-10	03	-20	-01	04	28+	10
75.	Friendly with H.S. teachers	-02	-14	05	-08	-01	18+	09
77.	H. S. academic awards	-28	-12	-46-	-07	13	03	10
78.	H. S. athletic awards	-09	14	01	-09	-04	44+	08
79.	H. S. government	-13	-20	-17	10	05	51+	41+
80.	H. S. science activities	-40-	-04	-41-	-28-	11	05	01

*The item numbers are those used in the earlier study.

Table 1, cont'd

No.	Item	Factors 3	4	5	7	8	9	10
81.	H. S. journalistic activities	00	15	-01	18+	-28	38+	-03
83.	H. S. hobby groups	04	03	-11-	-06	-18	-01	-09
84.	H. S. music activities	-06	-03	-20	-00	24+	-04	18
86.	Considered worker by H.S. teachers	-18	-54-	-06	-10	40+	-01	26
88.	Studied much in H.S.	-01	-27	06	-11	37+	-16	12
89.	Did much homework in H.S.	-02	-25	12	-16	30	-03	29+
90.	Reads rapidly	06	08	-07	17	-26-	14	10
91.	H.S. worker: students	-21	-45-	-08	-23	27	-06	11
92.	Easy to write	12	03	16	19+	-12	15	-10
93.	Tried for honor roll in H.S.	03	-45-	-01	-06	36	-11-	27+
96.	Grades above ability	-23	-14	-12	-26	43+	-21-	08
97.	Assignments in H.S.	-23-	-43	-09	-26	43+	01	25
98.	Learned to study in H.S.	-10	-25	-17	-04	06	05	36+
100.	Popular music	06	12	05	-23-	-03	02	-16
103.	Much dating	07	04	13	-05	-02	16+	02
107.	Mother had much education	17	20	-07-	01	-13	07	-01
110.	Parents like N.C.	12	-03	-03	08	-01	-01	19+
119.	Independent of parents	-18	07+	-08	06+	-18	22	-01
121.	Ignores students	-13	00	11+	04-	-14	18	10
122.	Likes own way	-17	10	-01	-01	-16-	03	01
123.	Not consult friends	-16-	01	02	-05	-02	-04	-04
124.	Not consider friends	05	01	08	08	-16	24+	28+
125.	Interested in politics	01	-39-	06	-13	04	14	24
126.	Concern: graft	07	-48-	04	05	07	05	24
131.	Concerned about racial bias	05	-18	25+	-28	-10	03	-05
133.	Concern: elderly	02	-46-	05	-38-	14	-07	09
135.	Concern: obscenity	-14	-49-	-12	-21	16	-17	15
136.	Concern: rigging	-10	-40-	03	-14	06	20	15
138.	Outraged by lynching	13	-22	20	-26-	-04	02	01
139.	Goes to evening lectures	-18	-07	-07	00	-20-	35+	04
140.	Owns many non-textbooks	-14	30+	-14	04	-28-	22	-05
141.	Reacts to art	00	-00	00	-02	-23	33+	-03
170.	Liberalism	13	02	35+	-22-	-10	13	-15
171.	Social conscience	08	-65-	13	-38-	13	-01	23
172.	Cultural sophistication	-05	01	-02	01	-41-	32	04
	College Application							
151.	Claims academic superiority	-11	-05	-05	-09	14+	-04	06
156.	Essay includes religion	-01	-28	-10	06	15	22+	40+
157.	Essay includes independence	03	06	-07	01	-19-	13	05
	High-School ratings							
142.	H. S. Rating on motivation	-51-*	-18	-49-*	-12	44+*	-14	11

* Values of 3, 2, 1, and 0 were used rather than merely 1 or 0.

TABLE 2

Intercorrelations of Conventional Predictors,

Factor Scores, and Criteria - 82 Males

		1 SAT	2 HS	3 F3	4 F4	5 F5	6 F7	7 F8	8 F9	9 F10	10 T	11 S	12 I	13 F
1.	SAT Total	-	34	-18	06	-27	-11	02	-17	-08	25	13	-08	16
2.	H.S. Rank	34	-	-26	-37	-26	-22	41	-35	03	45	41	25	36
3.	Factor 3	-18	-26	-	02	62	14	-12	08	05	-19	-15	-13	-13
4.	Factor 4	06	-37	02	-	-14	47	-52	32	-30	-36	-29	-08	-25
5.	Factor 5	-27	-26	62	-14	-	-14	-01	11	-04	-17	-00	-16	-14
6.	Factor 7	-11	-22	14	47	-14	-	-12	37	21	-17	-19	-12	-22
7.	Factor 8	02	41	-12	-52	-01	-12	-	-29	51	38	28	12	21
8.	Factor 9	-17	-35	08	32	11	37	-29	-	28	-25	-24	-10	-09
9.	Factor 10	-08	03	05	-30	-04	21	51	28	-	07	-14	-09	06
10.	Term Work	25	45	-19	-36	-17	-17	38	-25	07	-	69	36	58
11.	Standing	13	41	-15	-29	-00	-19	28	-24	-14	69	-	38	43
12.	Indep. Study	-08	25	-13	-08	-16	-12	12	-10	-09	36	38	-	42
13.	Faculty Ratings	16	36	-13	-25	-14	-22	21	-09	06	58	43	42	-

TABLE 3

Intercorrelations of Conventional Predictors,

Factor Scores, and Criterion - 56 Females

	1 SAT	2 HS	3 F3	4 F4	5 F5	6 F7	7 F8	8 F9	9 F10	10 T	11 S	12 I	13 F
1. SAT Total	-	34	-28	04	-12	-25	24	-44	-26	14	12	09	31
2. H. S. Rank	34	-	-49	-18	-44	-21	38	-00	18	34	36	21	16
3. Factor 3	-28	-49	-	19	64	40	-07	-16	-08	-24	-30	-20	-18
4. Factor 4	04	-18	19	-	12	23	-33	-12	-51	-22	-15	-16	-32
5. Factor 5	-12	-44	64	12	-	05	-05	-18	-32	-25	-17	-11	-20
6. Factor 7	-25	-21	40	23	05	-	-17	04	10	-01	-14	-04	-04
7. Factor 8	24	38	-07	-33	-05	-17	-	-40	08	41	31	13	38
8. Factor 9	-44	-00	-16	-12	-18	04	-40	-	40	04	18	25	-11
9. Factor 10	-26	18	-08	-51	-32	10	08	40	-	29	22	22	19
10. Term Work	14	34	-24	-22	-25	-01	41	04	29	-	80	48	40
11. Standing	12	36	-30	-15	-17	-14	31	18	22	80	-	50	37
12. Indep. Study	09	21	-20	-16	-11	-04	13	25	22	48	50	-	18
13. Faculty Rating	31	16	-18	-32	-20	-04	38	-11	19	40	37	18	-

TABLE 4

Intercorrelations of Conventional Predictors,

Factor Scores, and Criteria - Average For Males and Females

		1 SAT	2 HS	3 F3	4 F4	5 F5	6 F7	7 F8	8 F9	9 F10	10 T	11 S	12 I	13 F	14 Avg. Crit.
1.	SAT Total	-	34	-23	05	-20	-18	13	-30	-17	20	12	00	24	14
2.	H. S. Rank	34	-	-38	-28	-35	-22	40	-18	10	40	38	23	26	32
3.	Factor 3	-23	-38	-	10	63	27	-10	-04	-02	-22	-22	-16	-16	-19
4.	Factor 4	05	-28	10	-	-01	35	-42	10	-40	-29	-22	-12	-28	-23
5.	Factor 5	-20	-35	63	-01	-	-04	-03	-04	-18	-21	-08	-14	-17	-15
6.	Factor 7	-18	-22	27	35	-04	-	-14	20	16	-09	-16	-08	-13	-12
7.	Factor 8	13	40	-10	-42	-03	-14	-	-34	30	40	30	12	30	28
8.	Factor 9	-30	-18	-04	10	-04	20	-34	-	34	-10	-03	08	-10	-04
9.	Factor 10	-17	10	-02	-40	-18	16	30	34	-	18	04	06	12	10
10.	Term Work	20	40	-22	-29	-21	-09	40	-10	18	-	74	42	49	
11.	Standing	12	38	-22	-22	-08	-16	30	-03	04	74	-	44	40	
12.	Indep. Study	00	23	-16	-12	-14	-08	12	08	06	42	44	-	30	
13.	Faculty Ratings	24	26	-16	-28	-17	-13	30	-10	12	49	40	30	-	

TABLE 5

Correlation of Items With Conventional Predictors and Criteria

No.	Item	SAT		H. S.		TERM		STAND.		IND.		FAC.	
3.	Best in unfavorite	-07	-24	-07	-20	-09	-06	-01	-12	-14	-10	-06	05
4.	Worst in favorite	00	19	-22	47	-13	-02	13	-05	-09	-04	-04	-15
5.	Most in unfavorite	17	-03	02	07	02	40	-04	-46	04	-03	10	26
9.	Studies during term	24	-08	43	16	42	20	-25	-08	10	11	27	18
10.	Studies before tests	07	-29	25	-10	12	-06	-08	04	05	-00	06	-04
11.	Memorizes	09	-01	15	05	05	31	-06	-26	-16	19	-04	08
13.	Enjoys reading jokes	03	00	-01	06	10	-06	-01	09	13	-00	10	-06
16.	Enjoys math. puzzles	29	17	10	08	-02	15	19	-07	-11	18	-06	-05
19.	Anxious before test	-20	-16	01	-07	09	17	-01	-13	-13	08	19	-02
20.	Anxious on test	-09	-01	-04	-26	03	11	03	-05	-11	-03	01	08
26.	Studies for tests	-01	-14	03	12	-02	-03	-09	01	-12	-07	-07	-06
27.	Studies to avoid failure	-07	13	03	-10	07	-12	-10	12	07	-18	04	-07
30.	Studies for itself	-19	14	-00	10	-08	-02	06	00	10	01	-03	03
33.	Studies for teachers	04	05	14	01	08	03	-08	01	09	02	23	-10
34.	Studies for family	16	16	14	13	05	03	-02	01	-13	-13	18	-03
38.	Not bad for grades	-04	-15	02	05	03	-01	01	10	07	-14	07	-01
42.	Not bad to learn	-05	00	-12	00	06	00	06	00	03	00	19	00
43.	Not bad for itself	-14	-02	-16	02	04	-05	09	16	-04	-19	06	-04
45.	Not bad to help world	-09	00	10	00	07	00	-12	00	07	00	-04	00
46.	Not bad for teachers	03	21	-10	01	10	-05	-04	18	-09	-06	02	-04
48.	Not bad for students	-10	19	-04	-17	00	-09	07	12	-02	-38	-08	-10
49.	Not bad for yourself	-12	00	-05	00	-11	00	11	00	-09	00	-11	00
51.	Independent study	-03	-10	15	-03	16	-09	-17	19	24	-04	07	-09
52.	Discussion is good	-10	-23	-09	-05	-06	01	-07	15	24	-03	02	-00
59.	Creates art	14	-17	09	-30	22	-13	-06	24	03	08	06	-07
62.	Family: field	09	-02	-05	12	02	02	-07	11	11	07	04	06
63.	School: field	-01	-08	19	-09	17	-04	-08	06	-08	07	11	-04
64.	Friends: field	13	-01	04	09	-06	01	12	-08	02	-02	-04	-02
68.	Occupation decided	03	-18	02	01	10	-14	-19	22	05	-28	14	-18
73.	Extracurriculars	-06	05	-25	15	07	-07	12	-04	11	-14	20	08
75.	H.S. teacher friends	-11	-16	02	13	11	13	-09	-21	10	12	14	15
77.	H.S. academic awards	26	-02	44	50	11	24	-09	-22	15	21	21	-02
78.	H.S. athletic awards	-00	-20	-13	-13	-12	-11	16	-08	02	10	02	-15
79.	H.S. government	-39	-38	02	21	-10	24	14	-22	04	21	04	-02
80.	H.S. science	20	23	18	33	13	06	-04	-25	11	-01	26	04
81.	H.S. journalism	-08	-01	-20	-11	-18	-09	13	08	01	16	-17	-30
83.	H.S. hobby groups	05	08	-18	-08	-04	11	06	-08	-13	12	-03	14
84.	H.S. music	07	12	25	25	12	01	-08	-05	02	08	-04	23
86.	H.S. teachers: worker	-06	02	36	18	44	04	-33	-23	27	26	42	08
88.	Studied in H.S.	-11	21	15	14	24	10	-15	-19	02	-01	19	12
89.	Homework in H.S.	-09	-00	16	-07	08	14	05	-16	-02	04	18	30
90.	Reads rapidly	-01	-10	-24	03	-16	-06	13	18	-02	-05	03	-04
91.	H.S. students: worker	-04	22	24	24	34	24	-19	-19	24	19	36	11
92.	Easy to write	-21	01	-03	-12	-10	-12	07	10	10	24	04	04

No.	Item	SAT		H. S.		TERM		STAND.		IND.		FAC.	
93.	Tried for honor roll	03	05	34	27	40	-02	-24	06	17	05	29	21
96.	Grades above ability	02	19	26	36	23	18	-18	-13	18	13	29	21
97.	Assignments in H.S.	-06	17	24	41	35	22	-30	-16	22	28	32	08
98.	Learned study in H.S.	00	20	08	27	06	35	06	-33	05	32	10	32
100.	Popular music	-08	31	-13	00	-04	-11	17	02	19	07	06	06
103.	Much dating	01	-11	-19	02	-12	09	17	05	05	-18	-00	11
107.	Educated mother	-01	-25	-17	-34	-11	-25	21	28	-06	-21	-10	-07
110.	Parents like N.C.	16	-10	02	-01	01	31	00	-14	-01	-02	02	10
119.	Indep. of parents	01	-05	09	-19	07	-08	-19	07	34	24	10	-16
121.	Ignores students	04	-15	00	-07	10	03	-19	-06	14	07	12	-01
122.	Likes own way	-07	-10	03	-08	10	-13	-02	11	11	-28	06	-15
123.	Not consult friends	01	10	-03	-09	-02	-19	-03	18	-18	-16	-15	-05
124.	Not consider friends	-17	-10	-26	-19	-14	-08	20	16	-10	14	-29	-26
125.	Interest in politics	-14	04	04	01	07	11	-19	-13	19	15	08	13
126.	Concern: graft	-07	-24	-11	-00	00	12	-02	00	-10	-10	01	04
131.	Concern: racial bias	-02	02	04	-03	03	-06	-17	-04	03	08	12	01
133.	Concern: elderly	10	22	32	-06	19	04	-31	06	25	21	11	12
135.	Concern: obscenity	-07	14	19	05	11	19	06	-19	-16	12	06	39
136.	Concern: rigging	-14	-19	02	08	-12	03	-07	-06	04	03	-11	20
138.	Concern: lynching	27	-08	07	-20	14	-22	-20	10	03	01	06	-10
139.	Goes to lectures	-10	04	-04	05	-03	10	-12	-20	01	30	13	-00
140.	Owns many books	10	09	-21	-01	-04	-20	-01	06	-02	05	12	-10
141.	Reacts to art	02	-13	-07	02	02	-09	-02	-04	-07	05	08	04
142.	Good H.S. ratings	06	19	38	50	43	50	-37	-33	37	18	37	39
151.	Claims superiority	-04	05	06	05	04	18	-15	-23	17	-03	00	19
156.	Religion in essay	-15	-35	06	19	13	-05	-19	-01	11	02	06	-02
157.	Independ. in essay	03	-16	-09	03	08	14	06	-21	02	20	-10	04
170.	Liberalism score	-11	-11	-04	-05	01	-10	-20	-03	14	-01	-03	-11
171.	Social conscience	-04	-11	17	-06	25	04	-27	-03	11	10	27	09
172.	Cultural sophist.	-09	-05	-08	01	-04	-01	-04	-14	06	17	17	04

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University of Umea
Department of Psychology
Umea 6, Sweden

1 LCDR J. C. Meredith, USN (Ret.)
Institute of Library Research
University of California, Berkeley
Berkeley, California 94720

1 Executive Secretariat
Interagency Committee on Manpower
Research
Room 515
1738 M Street, N.W.
Washington, D.C. 20036
ATTN: Mrs. Ruth Relvea

1 Dr. Marshall J. Farr
Assistant Director, Engineering
Psychology Program
Office of Naval Research (Code 455)
Washington, D.C. 20360

1 Mr. Joseph B. Blankenheim
NAVELEX 0474
Munitions Building, Room 3721
Washington, D.C. 20360

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Center for Computer Sciences
and Technology
National Bureau of Standards
Washington, D.C. 20234

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Naval Ship Systems Command
Main Navy Building, Room 1532
Washington, D.C. 20360

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Naval Medical Research Institute
National Naval Medical Center
Bethesda, Maryland 20014

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San Diego, California 92152

1 Technical Library
Naval Undersea Warfare Center
3202 E. Foothill Boulevard
Pasadena, California 91107

1 AFHRL (HRTT/Dr. Ross L. Morgan)
Wright-Patterson AFB
Ohio 45433

1 AFHRL (HRO/Dr. Meyer)
Brooks AFB, Texas 78235

1 Mr. Michael Macdonald-Ross
International Training & Education
Company Limited
ITEC House
29-30 Ely Place
London EC1
England

1 Commanding Officer
U. S. Naval Schools Command
Mare Island
Vallejo, California 94592

1 Dr. Don C. Coombs, Assistant Director
ERIC Clearinghouse
Stanford University
Palo Alto, California 94305

1 CDR H. J. Connery, USN
Scientific Advisory Team (Code 71)
Staff, COMASWFORLANT
Norfolk, Virginia 32511

1 ERIC Clearinghouse
Educational Media & Technology
Stanford University
Stanford, California

1 ERIC Clearinghouse
Vocational & Technical Education
Ohio State University
Columbus, Ohio 43212